Determining the Volatility of Ultrafine (UF) PM Emissions from CNG Vehicles

Contract#: 500-06-043
Contractor: California Air Resources Board
Contract Amount: $350,000
Contract Term: June 2007 to December 2010
Contractor Project Manager: John Collins
Commission Project Manager: Tony Tully

The Issue

Many epidemiological and toxicological studies have demonstrated strong links between ambient particulate matter (PM) originating from mobile sources and adverse health outcomes. In urban environments, such as that of Los Angeles, California, the most dominant source of ultrafine (UF) PM is direct emissions from motor vehicles. Limited research has been done to characterize compressed natural gas (CNG) mass emissions and practically no work focused on the determination of the size-segregated volatility of UF particles from CNG engines. For this project, several different types of engines will be tested, and several different definitions of volatility will be applied.

Project Description

This research will determine the volatility of UF PM emissions from CNG vehicles equipped with various types of emission-control technologies representing near-term technology. In this project, researchers will collect samples of the UF PM for chemical speciation. This data will inform researchers as to the volatility of UF PM and will allow a better understanding of its formation, possible health effects, and control strategies. Once both the relative toxicity and volatility of UF PM emissions are known, emission-control technology that will best protect human health can be identified for CNG vehicles. This, in turn, will reduce the deployment barriers and help expand the availability of vehicles capable of using alternative fuels.

PIER Program Objectives and Anticipated Benefits for California

This project will develop and help bring to market advanced transportation technologies that reduce air pollution and greenhouse gas emissions beyond applicable standards, and that benefit natural gas ratepayers (Public Resources Code 25620.1.[b] [1], Chapter 512, Statues of 2006) by reducing health and environmental impacts from air pollution, and greenhouse gas emissions related to natural gas use.

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